



Restek Air

# Gas Sampling Bags

## Cost-Effective Alternatives for Air Sampling

- Ideal for whole air sampling at ppb-ppm levels.
- Select from Tedlar, ALTEF, and multi-layer foil bags in a wide range of sizes.
- Extensive line of sampling accessories and replacement parts makes it quick and convenient to get fully equipped.



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# Gas Sampling Bags




## Cost-Effective Alternatives for Air Sampling



Gas sampling bags are whole air sampling devices useful for sampling part-per-billion (ppb) to part-per-million (ppm) levels of volatile organic compounds (VOCs) and permanent gases. Sampling bags can be a cost-effective alternative to canisters and solvent/thermal desorption tubes and are appropriate for many applications, including industrial hygiene, landfill/biogas, ambient air, indoor air, and stationary source testing.

Compare gas sampling bags to other techniques and then choose the bag that's right for your air sampling program.

### Gas Sampling Bags are a Cost-Effective Alternative to Cans and Tubes for Many Applications

			
	Canister	Gas Sampling Bag	Solvent/Thermal Desorption Tube
<b>Media Type</b>	whole air	whole air	adsorption
<b>Sensitivity</b>	ppt-ppb	ppb-ppm	ppb-ppm
<b>Technique</b>	passive (no pump)	active	active/passive
<b>Sample Type</b>	grab or integrated	grab or integrated	grab or integrated
<b>Analyte</b>	wide range of VOCs & permanent gases	wide range of VOCs & permanent gases	sorbent specific
<b>Applications</b>	ambient, IAQ, emergency response, IH	ambient, IAQ, emission	ambient, IAQ, IH
<b>Durability</b>	reusable	one time use	solvent: one time use thermal: reusable <i>(performance is sorbent specific)</i>
<b>Inertness</b>	excellent	fair	fair
<b>Stability</b>	30 day	48 hrs	varies by analyte
<b>Sample Volume</b>	0.4–15 L	0.5–100 L	varies by analyte
<b>Sampling Time</b>	seconds to days	minutes to hours	minutes to days

## General Guidelines for Bag Sampling

Follow these basic considerations for trouble-free air sampling using gas sampling bags.

### Before Sampling

- Store unused bags in a clean environment, sealed in an outer bag to prevent adsorption of contaminants.
- Preclean bags before use by flushing with high-purity nitrogen.
- Leak rate should not exceed 0.1" Hg/min.

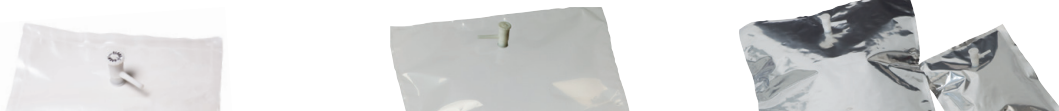
### During Sampling

- Do not fill bags more than 80%.
- Be sure the PTFE tubing used for bag connection is clean.
- Use a vacuum box sampler for direct bag filling in order to avoid contamination from a sampling pump.
- 3 L/min is a typical flow rate.

### After Sampling

- Bags are intended for single use due to potential sample adsorption onto the bag film.
- Hold times are typically 48 hours unless validation study demonstrates longer stability.
- Protect samples from direct sunlight and store above 0 °C to prevent condensation.
- Transport in rigid, opaque container to prevent bag puncture; do not ship by air unless samples will be kept in a pressurized area.

## Selecting the Right Bag for Your Applications



	Tedlar bags	ALTEF Bags	Multi-Layer Foil Bags
<b>Properties</b>	<ul style="list-style-type: none"> <li>• Low gas permeation levels for most gases.</li> <li>• High tensile strength.</li> <li>• Withstands temperatures up to 82 °C (180 °F) with polypropylene valves or 202 °C (397 °F) with stainless steel valves.</li> </ul>	<ul style="list-style-type: none"> <li>• Developed specifically for gas sampling applications.</li> <li>• Chemically inert to most acids, aliphatic and aromatic organic compounds, chlorinated solvents, and alcohols.</li> <li>• Max. operating temp: 82°C (180 °F).</li> </ul>	<ul style="list-style-type: none"> <li>• Ideal for collecting low molecular weight compounds such as CH<sub>4</sub>, H<sub>2</sub>S, CO, and CO<sub>2</sub>.</li> <li>• Foil layers provide very low permeability and a complete moisture barrier.</li> <li>• Opaqueness protects samples from ultraviolet light.</li> <li>• Max. operating temp: 82 °C (180 °F).</li> </ul>
<b>Advantages</b>	<ul style="list-style-type: none"> <li>• Recommended in many EPA testing methods.</li> <li>• Bags resist puncture in the field.</li> <li>• Only bag available with stainless steel valves.</li> <li>• Unaffected by the chemical components of commonly sampled gases, such as carbon monoxide, sulfur dioxide, hydrogen sulfide, radon, and mercaptans.</li> </ul>	<ul style="list-style-type: none"> <li>• Suitable for sampling most VOCs and many sulfur compounds.</li> <li>• Low VOC background.</li> <li>• Does not exhibit background levels of dimethylacetamide (DMAC) or phenol as Tedlar material does.</li> <li>• Lower permeability than Tedlar bags to CO<sub>2</sub>, N<sub>2</sub> and CH<sub>4</sub>.</li> </ul>	<ul style="list-style-type: none"> <li>• The only bag material that adequately holds H<sub>2</sub>S.</li> <li>• Ideal for collecting low molecular weight compounds.</li> <li>• Very low permeability to O<sub>2</sub> and CO<sub>2</sub>.</li> <li>• Good VOC stability.</li> </ul>
<b>Limitations</b>	<ul style="list-style-type: none"> <li>• Exhibits background levels of dimethylacetamide (DMAC) and phenol.</li> <li>• High permeation rate for CO<sub>2</sub>.</li> <li>• Relatively high permeation rate for O<sub>2</sub>.</li> </ul>	<ul style="list-style-type: none"> <li>• More permeable to most compounds than Tedlar bags.</li> <li>• Not suitable for sampling ketones and esters in high concentrations (&gt;30%).</li> <li>• Less resistance to UV light than Tedlar material.</li> <li>• Many sulfur compounds should be analyzed within 24 hours.</li> </ul>	<ul style="list-style-type: none"> <li>• Not recommended for collecting low ppm to high ppb VOCs due to background levels from bag materials.</li> <li>• Recommend analyzing within 48 hours after collection for CH<sub>4</sub>, H<sub>2</sub>S, CO, and CO<sub>2</sub>.</li> </ul>
<b>Composition</b>	polyvinyl fluoride (PVF) polymer resin	Proprietary polyvinylidene fluoride (PVDF) film	4-layer (60 gauge nylon outer layer, polyethylene, 0.0003" aluminum foil, 0.002" polyethylene inner layer)
<b>Thickness</b>	0.002"	0.003"	0.004"
<b>Tensile Strength</b>	8,000 psi	6,100 psi	19 lb/in
<b>Max. Pressure</b>	~2 psi (~ 0.14 bar) or ≤80% filled	~2 psi (~ 0.14 bar) or ≤80% filled	~2 psi (~ 0.14 bar) or ≤80% filled
<b>Max. Operating Temp.</b>	Withstands temperatures up to 82 °C (180 °F) with polypropylene valves or 202 °C (397 °F) with stainless steel valves.	82 °C (180 °F)	82 °C (180 °F)
<b>Specific Gravity</b>	1.7 g/mL	1.78 g/mL	1.09 g/mL
<b>Oxygen Permeability</b>	50 cc/m <sup>2</sup> /day	58 cc/m <sup>2</sup> /day	0.0078 cc/m <sup>2</sup> /day
<b>Water Vapor Permeability</b>	9–57 g/m <sup>2</sup> /day	12–15 g/m <sup>2</sup> /day	0.0078 g/m <sup>2</sup> /day
<b>Carbon Dioxide Permeability</b>	172 cc/m <sup>2</sup> /day	172 cc/m <sup>2</sup> /day	0.0078 cc/m <sup>2</sup> /day

## Tedlar Sampling Bags

- Find the bags you need—we offer sizes from 0.5 L to 100 L.
- Lightweight and easy to use.
- Available with polypropylene or stainless steel valve; choose bags with a septum fitting for syringe sampling or standard spiking.
- Maximum operating temperature: 82 °C (180 °F) with polypropylene valves or 202 °C (397 °F) with stainless steel valves.



### Physical Specifications:

Composition: polyvinyl fluoride (PVF) polymer resin  
 Thickness: 0.002"  
 Tensile Strength: 8,000 psi  
 Max. Operating Temp.: 82 °C (180 °F) with polypropylene valves or 202 °C (397 °F) with stainless steel valves  
 Specific Gravity: 1.7 g/mL  
 Oxygen Permeability: 50 cc/m<sup>2</sup>/day  
 Water Vapor Permeability: 9–57 g/m<sup>2</sup>/day  
 Carbon Dioxide Permeability: 172 cc/m<sup>2</sup>/day



Description	Size	Polypropylene Valve & Septum Fitting		Stainless Steel Push/Pull Valve & Septum Fitting		Stainless Steel Push/Pull Valve Only	
		qty.	cat.#	qty.	cat.#	qty.	cat.#
0.5 L Tedlar Sampling Bag	6" x 6"	10-pk.	22049	10-pk.	27380	10-pk.	27390
1 L Tedlar Sampling Bag	7" x 7"	10-pk.	22050	10-pk.	27381	10-pk.	27391
3 L Tedlar Sampling Bag	9.5" x 10"	10-pk.	22051	10-pk.	27382	10-pk.	27392
5 L Tedlar Sampling Bag	12" x 12.5"	10-pk.	22052	10-pk.	27383	10-pk.	27393
10 L Tedlar Sampling Bag	11.75" x 22"	10-pk.	22053	10-pk.	27384	5-pk.	27394
12 L Tedlar Sampling Bag	13" x 24"	10-pk.	22054	10-pk.	27385	5-pk.	27395
25 L Tedlar Sampling Bag	17.5" x 24"	5-pk.	22055	5-pk.	27386	5-pk.	27396
40 L Tedlar Sampling Bag	24" x 24.25"	5-pk.	22056	5-pk.	27387	5-pk.	27397
80 L Tedlar Sampling Bag	28.25" x 30.5"	5-pk.	22057	5-pk.	27388	3-pk.	27398
100 L Tedlar Sampling Bag	28" x 36"	3-pk.	22058	3-pk.	27389	3-pk.	27399

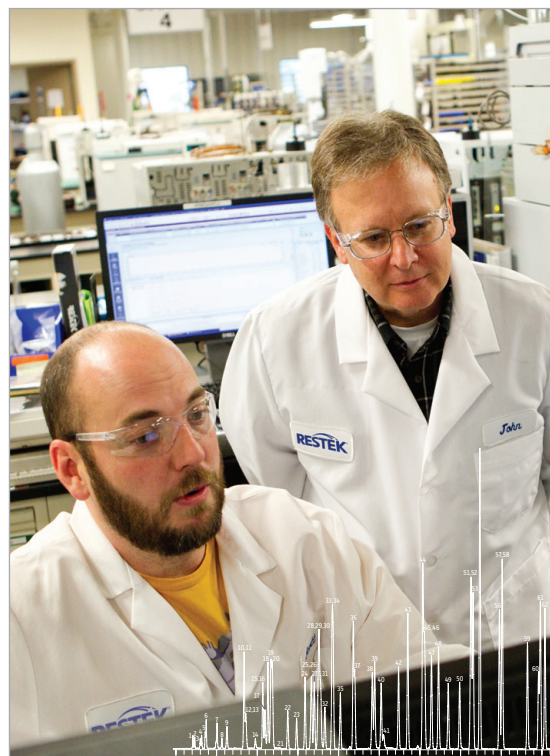
Description	qty.	cat.#		
PTFE-Faced Silicone Replacement Septum, 4 mm diameter	10-pk.	22104		

Note: Use only Point Style 5 syringes.

## VOC Stability in Tedlar Bags

Compound	Recovery (%)	
	Day 1	Day 2
Acetone	99.0	95.0
Acetonitrile	74.0	66.0
Acrylonitrile	90.0	80.0
Allyl chloride	102.0	94.0
Benzene	104.0	98.0
Bromoethane	99.0	100.0
1,3-Butadiene	99.0	95.0
Butane	98.0	94.0
Butyl acetate	104.0	102.0
Carbon tetrachloride	104.0	102.0
Chloroform	98.0	95.0
1,2-Dichloroethane	100.0	97.0
Dichloropropane	105.0	101.0
Ethyl acetate	98.0	96.0
Ethylene	100.0	102.0
Heptane	100.0	100.0
Hexane	101.0	101.0
Isooctane	100.0	97.0
Isopropyl alcohol	101.0	99.0
Methyl ethyl ketone	99.0	98.0
Methyl- <i>t</i> -butyl ether	101.0	101.0
Methylene chloride	102.0	97.0
Octane	100.0	97.0
Perchloroethylene	105.0	94.0
Propylene	103.0	104.0
Propylene oxide	96.0	95.0
Tetrahydrofuran	103.0	100.0
Toluene	96.0	92.0
1,1,1-Trichloroethane	104.0	101.0
Trichloroethylene	104.0	103.0
Vinylidene chloride	102.0	100.0
p-Xylene	89.0	83.0

Acceptability criteria: ≥80% recovery at ≥2 days based on EPA Method 0040



## Nitrogen Dioxide Stability in Tedlar Bags

Compound	Recovery (%)	
	Day 1	Day 2
Nitrogen dioxide	54.5	36.4

## ALTEF Gas Sampling Bags

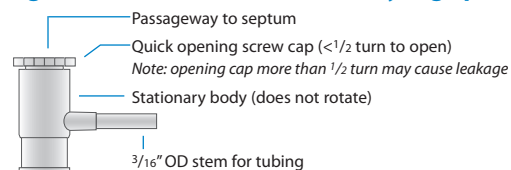
- Excellent alternative to Tedlar bags for collection of most VOCs.
- Unlike Tedlar bags, ALTEF bags do not produce background levels of dimethylacetamide (DMAC) or phenol.
- Very low VOC and sulfur background compared to Tedlar bags.
- Not recommended for ketones, acetates, hydrogen sulfide, or permanent gases.
- Durable polyvinylidene fluoride (PVDF) film is resistant to abrasion and chemicals, including most acids and organic compounds.
- Contain no additives, fillers, or pigments.



### Get the convenience of having both a hose connection and a syringe port in a single valve!

#### Polypropylene Combo Valve

- Inert polypropylene
- 3/16" diameter valve stem
- Replaceable PTFE-faced septum



#### Physical Specifications:

Composition: proprietary polyvinylidene fluoride (PVDF) film  
 Thickness: 0.003"  
 Tensile Strength: 6,100 psi  
 Max. Operating Temp.: 82 °C (180 °F)  
 Specific Gravity: 1.78 g/mL  
 Oxygen Permeability: 58 cc/m<sup>2</sup>/day  
 Water Vapor Permeability: 12-15 g/m<sup>2</sup>/day  
 Carbon Dioxide Permeability: 172 cc/m<sup>2</sup>/day

Volume	Size	qty.	cat.#
0.5 L	6" x 6"	10-pk.	22958
1 L	7" x 7"	10-pk.	22959
3 L	10" x 10"	10-pk.	22960
5 L	12" x 12"	10-pk.	22961
10 L	12" x 22"	10-pk.	22962
12 L	13" x 24"	10-pk.	26328
25 L	18" x 24"	5-pk.	22963
40 L	24" x 24.25"	5-pk.	26329
80 L	28.25" x 30.5"	3-pk.	26330
100 L	28" x 36"	3-pk.	26331
PTFE-Faced Silicone Replacement Septum, 4 mm diameter			10-pk. 22104

Note: Use only Point Style 5 syringes.



## Multi-Layer Foil Gas Sampling Bags

- Good stability for low molecular weight compounds, such as methane, CO<sub>2</sub>, and permanent gases.
- Chemically inert with light and moisture protection.
- Not recommended for low ppm VOCs due to background levels.
- Protective 4-layer barrier minimizes gas permeability.
  - 60 gauge nylon (outer layer)
  - 0.0003" aluminum foil
  - Polyethylene
  - 0.002" polyethylene (inner layer)
- Maximum operating temperature: 82 °C (180 °F).

#### Physical Specifications:

Composition: 4-layer  
 Thickness: 0.004"  
 Tensile Strength: 19 lb/in  
 Max. Operating Temp.: 82 °C (180 °F)  
 Specific Gravity: 1.09 g/mL  
 Oxygen Permeability:  
 0.0078 cc / m<sup>2</sup> / day @ 0% RH, 23 °C  
 Water Vapor Permeability:  
 0.0078 g / m<sup>2</sup> / day @ 90% RH, 40 °C  
 Carbon Dioxide Permeability: 0.0078 cc / m<sup>2</sup> / day

Volume	Size	qty.	cat.#
1 L	7" x 7"	5-pk.	22950
3 L	10" x 10"	5-pk.	22951
5 L	12" x 12"	5-pk.	22952
10 L	12" x 22"	5-pk.	22953
12 L	13" x 24"	5-pk.	22966
25 L	18" x 24"	5-pk.	22967
40 L	24" x 24.5"	5-pk.	22968
PTFE-Faced Silicone Replacement Septum, 4 mm diameter			10-pk. 22104

Note: Use only Point Style 5 syringes.

# Application Recommendations for ALTEF and Multi-Layer Foil Gas Sampling Bags

Sulfur Compounds		
Compound	Recommended Sampling Bag Material	
	ALTEF	Multi-Layer Foil
<i>n</i> -Butyl mercaptan	✘	✘
<i>tert</i> -Butyl mercaptan	☑	☑
Carbon disulfide*	☑	✘
Carbonyl sulfide	☑	☑
Diethyl disulfide	✘	✘
Diethyl sulfide*	☑	✘
Dimethyl disulfide	✘	✘
Dimethyl sulfide*	☑	✘
2,5-Dimethylthiophene	✘	✘
Ethyl mercaptan*	☑	☑
Ethyl methyl sulfide*	☑	✘
2-Ethylthiophene	✘	✘
Hydrogen sulfide	✘	☑
Isobutyl mercaptan*	☑	✘
Isopropyl mercaptan*	☑	☑
3-Methylthiophene	✘	✘
Methyl mercaptan*	☑	☑
<i>n</i> -Propyl mercaptan*	☑	☑
Tetrahydrothiophene	✘	✘
Thiophene*	☑	✘

- ☑ = Recommended
- ☑ = May be suitable
- ✘ = Not suitable

\* ALTEF bags can be used to sample these sulfur compounds if the sample is analyzed within 24 hours.

\*\* Multi-layer foil bags can be used to sample most VOCs, but are not recommended for collecting low ppm to high ppb VOCs due to background levels from bag materials.

ALTEF bags are recommended for most VOCs, if analyzed within 48 hours, and for many sulfur compounds, if analyzed within 24 hours.

Multi-layer foil bags are recommended for methane, hydrogen sulfide, carbon monoxide, and carbon dioxide, if analyzed within 48 hours.

VOCs		
Compound	Recommended Sampling Bag Material	
	ALTEF	Multi-Layer Foil**
Acetone	✘	☑
Acetonitrile	✘	☑
Acrylonitrile	✘	☑
Allyl chloride	☑	☑
Benzene	☑	☑
Bromoethane	☑	☑
Butyl acetate	✘	☑
Carbon tetrachloride	☑	☑
Chloroform	☑	☑
Carbon dioxide	☑	☑
Carbon monoxide	☑	☑
1,2-Dichloroethane	☑	☑
Dichloropropane	☑	☑
Ethyl acetate	✘	☑
Ethylene	☑	☑
Heptane	☑	☑
Hexane	☑	☑
Isooctane	☑	☑
Isopropyl alcohol	☑	☑
Methane	☑	☑
Methyl ethyl ketone	✘	☑
Methylene chloride	☑	☑
Methyl <i>tert</i> -butyl ether	☑	☑
Octane	☑	☑
Perchloroethylene	☑	☑
Propylene	☑	☑
Propylene oxide	☑	☑
Tetrahydrofuran	☑	☑
Toluene	✘	☑
1,1,1-Trichloroethane	☑	☑
Trichloroethylene	☑	☑
Vinylidene chloride	☑	☑
<i>p</i> -Xylene	✘	☑



## Vacuum Bag Sampler

Description	qty.	cat.#
Vacuum Bag Sampler Model 1062 (includes: power adaptor, battery, manual)	ea.	22118

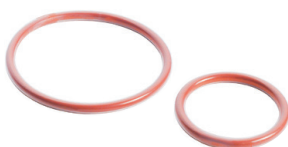
## Replacement Parts for Vacuum Bag Sampler

Description	qty.	cat.#
Replacement Battery for Vacuum Bag Sampler Model 1062	ea.	22119
Universal Battery Charger for Vacuum Bag Sampler Model 1062 (115/230 VAC)	ea.	22120

## Jumbo Syringe



Volume	Model	SGE		Restek	
		cat.#	qty.	cat.#	qty.
500 mL	500MAR-LL-GT	009910	ea.	21275	ea.
1000 mL	1000MAR-LL-GT	009920	ea.	21276	ea.
2000 mL	2000MAR-LL-GT	009930	ea.	21277	ea.



## Syringe O-Rings

Syringe Volume	SGE		Restek	
	cat.#	qty.	cat.#	qty.
500 mL	032527	ea.	21278	ea.
1,000 mL	032532	ea.	21279	ea.



## Vacuum Pumps (Rocker)

Description	Flow capacity	Voltage	qty.	cat.#
Rocker 300	21 L/min	AC110 V, 60 Hz	ea.	27424
Rocker 300	18 L/min	AC220 V, 50 Hz	ea.	27425
Rocker 300DC*	25 L/min	DC Power (12 V)	ea.	27447
Rocker 400	37 L/min	AC110 V, 60 Hz	ea.	27432
Rocker 400	34 L/min	AC220 V, 50 Hz	ea.	27433
Rocker 410	23 L/min	AC110 V, 60 Hz	ea.	27434
Rocker 410	20 L/min	AC220 V, 50 Hz	ea.	27435
Rocker 500	28 L/min	AC110 V, 60 Hz	ea.	27436
Rocker 500	23 L/min	AC220 V, 50 Hz	ea.	27437

\*For use with automotive type 12 V battery.



## Vacuum Pumps (Chemker)

Description	Flow capacity	Voltage	qty.	cat.#
Chemker 300 PTFE	20 L/min	AC110 V, 60 Hz	ea.	27426
Chemker 300 PTFE	18 L/min	AC220 V, 50 Hz	ea.	27427
Chemker 400 PTFE	38 L/min	AC110 V, 60 Hz	ea.	27428
Chemker 400 PTFE	33 L/min	AC220 V, 50 Hz	ea.	27429
Chemker 410 PTFE	20 L/min	AC110 V, 60 Hz	ea.	27430
Chemker 410 PTFE	18 L/min	AC220 V, 50 Hz	ea.	27431

Learn more at [www.restek.com/air](http://www.restek.com/air)

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